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## **Marine Bioacoustics: Back to the Future**

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### **LONG-TERM GOALS**

The primary goal of our project is to provide advanced undergraduates, graduate students, and postdoctoral investigators with a broad understanding of ocean acoustics as well as the techniques used to study the ecology of marine animals *in situ*. By bringing together many of the top researchers in marine bioacoustics, biological oceanography, and marine biology, we provide students with a unique opportunity to work side by side with world experts using state-of-the-art tools and technologies. A secondary goal of the project is to provide a setting for developing and testing new technologies. In this manner, it serves as a research magnet, attracting leading scientists to conduct their own research in a creative teaching and learning environment that catalyzes interactions across the various disciplines associated with Bioacoustical Oceanography.

### **OBJECTIVE**

To provide students with a broad understanding of the acoustic techniques used to study the distribution and behavior of marine animals in the context of their physical/chemical/biological environment.

### **APPROACH**

Through lectures, demonstrations, and field exercises, we provide students with a unique opportunity to learn and work side by side with top scientists using state-of-the-art bioacoustic tools and techniques. During the winter course, two field projects were conducted:

1. A study to try to estimate relationship between humpback whale size and acoustic source level using photogrammetry and an acoustic array,
2. A study to evaluate new multi-frequency echo sounder deployed in a tow body and towed behind a Liquid Robotics Wave Gider

## **WORK COMPLETED**

Fifteen undergraduate students were trained in an intensive, 3-week course in Conservation Oceanography offered on the Big Island of Hawaii during Winter 2012. Two of the weeks focused on the use of passive acoustic methods in animal sound classification and localization and active acoustic methods in studying micronekton vertical migration patterns.

## **RESULTS**

Highlights of student experiences included successful demonstration of Wave Glider's capability for collecting multi-frequency acoustic data.

## **IMPACT**

Students from around the world come to these courses because they provide the best training available in Marine Bioacoustics. The 15 student participants in this year's course, three of which were from underrepresented minority groups, bring our total number of students since 1993 up to 252 students from 30 different countries. Alumni from our courses have become national and international leaders in the fields of Marine Bioacoustics and Bioacoustical Oceanography, and we are now training the second generation of students in this field (training the students of our former students).

## **RELATED PROJECTS**

None